	SARMA GUIDELINE	Document Number
	SAFETY, HEALTH, ROAD TRANSPORT, ENVIRONMENTAL & QUALITY STANDARD	SHE2.23-F01
		Revision Number
	GENERAL ELECTRICAL INSTALLATIONS	00
		Page Number
		1 of 8

GENERAL ELECTRICAL INSTALLATIONS & ELECTRICAL DRIVEN MACHINERY

(SARMA Audit document January 2017 version 1 reference number:

Section A, Element 2, Item 2.6.2;

Section A, Element 8, Items 8.1.1 to 8.1.3 & 8.1.19;

Section B, Element 3, items 3.1.1, 3.1.2, 3.2.3, 3.2 & 3.3;

Section B, Element 9, item 9.1 to 9.5, entire 9.6 & entire 9.7 and

Section B, Element 10, Items 10.1 & 10.2)



	SARMA GUIDELINE		Document Number
	SAFETY, HEALTH, ROAD TRANSPORT, ENVIRONMENTAL & QUALITY STANDARD		SHE2.23-F01
	GENERAL ELECTRICAL INSTALLATIONS		Revision Number
			00
		Page Number	1 of 8

Table of Contents

ENTRY NUMBER	DESCRIPTION	PAGE NUMBER
1	PURPOSE.....	3
2	SCOPE.....	3
3	RESPONSIBILITY AND ACCOUNTABILITY.....	3
4	DEFINITIONS AND ABBREVIATIONS.....	3
5	LEGAL AND OTHER REQUIREMENTS	
5.1	General.....	3
5.2	Legal Reference.....	4
5.3	Other Requirements.....	4
6	RECORDS.....	4
7	PROCEDURE.....	4-6
8	ASSOCIATED DOCUMENTATION.....	8

 SOUTHERN AFRICA READY MIX ASSOCIATION	SARMA GUIDELINE		Document Number
	SAFETY, HEALTH, ROAD TRANSPORT, ENVIRONMENTAL & QUALITY STANDARD		SHE2.23-F01
	GENERAL ELECTRICAL INSTALLATIONS		Revision Number
			00
			Page Number
			1 of 8

1. PURPOSE

The purpose of this standard is:

- 1.1. To ensure that all new and existing electrical installations are safe, will not contribute to injury, fire or explosion and comply with legal requirements and
- 1.2. To ensure that all flameproof equipment in hazardous locations are identified, registered and inspected by a competent person and records maintained.

2. SCOPE

- 2.1. This standard applies to **EMPLOYERS**.

3. RESPONSIBILITY AND ACCOUNTABILITY

It is the responsibility of the Section 16(2) Appointee's [SHE5.11-F02-3] to ensure that the requirements of this standard are adhered to. The Section 16(2) Appointee's [SHE5.11-F02-3] will be responsible to monitor the standard.

4. DEFINITIONS AND ABBREVIATION

4.1. ELECTRICAL INSTALLATION

Electrical installation means any machinery in or on any premises, used for the transmission of electrical energy from a point of control to a point of consumption, including any item forming part of such installation, which is not part of the electrical circuit (see Electrical Installation Regulation 1).

4.2. FLAMEPROOF APPARATUS

Flameproof apparatus means an electrical apparatus generator, so designed and constructed, as to prevent the ignition of any gas, dust or other explosive material, which may be present in the surrounding atmosphere.

4.3. HAZARDOUS LOCATION


A location where there is danger of fire or explosion and

- 4.3. See manuals one to five.


5. LEGAL AND OTHER REQUIREMENTS

5.1. General


No.	Document Number	Description
5.1.1.	SHE5.03-F01	Electrical Installation Regulations.
5.1.2.	SHE5.03-F01	Electrical Machinery Regulations.

	SARMA GUIDELINE		Document Number
	SAFETY, HEALTH, ROAD TRANSPORT, ENVIRONMENTAL & QUALITY STANDARD		SHE2.23-F01
			Revision Number
	GENERAL ELECTRICAL INSTALLATIONS		00
Page Number			
		1 of 8	

5.1.3.	SHE5.03-F01	SABS 0142 – The wiring of premises
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	SARMA GUIDELINE		Document Number
	SAFETY, HEALTH, ROAD TRANSPORT, ENVIRONMENTAL & QUALITY STANDARD		SHE2.23-F01
	GENERAL ELECTRICAL INSTALLATIONS		Revision Number
			00
			Page Number
			1 of 8

5.1.4.	SHE5.03-F01	<p>SABS 1080 – Classification of hazardous locations</p> <ul style="list-style-type: none"> • Apparatus for hazardous location – closely linked to SABS 086 • Class I, Div 0, 1, 2 now Zone 0, 1, 2 • Class II, Div 1, 2 now Zone 21, 22 • Classification of locations in which fires / explosions can occur due to flammable gasses, vapours, dusts, fibres to permit proper selection for electrical & mechanical equipment in such locations • Descriptions of apparatus: Ex d, Ex I, Ex e, Ex p, Ex N, Ex s, Ex m, Ex g, • Classes of flammable Liquids – p.7 • Principles of classifications of areas: <ol style="list-style-type: none"> 1. Identify source of release of flammable materials (e.g. seals, vents, drainage points, free liquid surface) 2. Divide into zones according to frequency of flammable atmosphere and its duration 3. Calculate extent of hazard zone it to rate of release & temperature/pressure, and nature of substance 4. Allocate appropriate equipment (3D area classification drawings recommended) • Zone 0: Flammable gases / vapours (fg/v) continuously present in concentrations within lower and upper limits of flammability. Rare – limited to confined spaces, such as storage tanks. <p><i>Apparatus : Ex ia (SABS 086 covers lighting protection for such apparatus)</i></p> <ul style="list-style-type: none"> • Zone 1: a) hazardous concentrations of fg/v occur intermittently / periodically under normal operating conditions <p>b) ... occur frequently because of repair / maintenance / leakage</p> <p>c) breakdown of equipment might release hazardous concentrations and might cause simultaneous failure of electrical equipment.</p> <p>Examples:- all hazardous areas in mines</p> <ul style="list-style-type: none"> - Volatile flammable liquids / gases transferred from one container to another - Interior of spray booths, vicinity of spray painting - Open tanks of volatile flammable liquids - Drying rooms for evaporation of flammable solvents - Use of flammable solvents <p><i>Apparatus: Ex d, Ex s, Ex e, Ex m, Ex q, Ex ai/ib, Ex p, or combination of these</i></p> <ul style="list-style-type: none"> • Zone 2: Operations are so well controlled that an explosive concentration is only likely to occur under abnormal conditions. <p>Minimum requirements for classification as Zone 2:</p> <ol style="list-style-type: none"> 1. Well ventilated so that vapour is rapidly dispersed and contact with electrical equipment is of minimal duration 2. Complete segregation from Zone 0 or 1 is ensured 3. Bursting discs / release valves on containers situated outside the area
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	SARMA GUIDELINE		Document Number
	SAFETY, HEALTH, ROAD TRANSPORT, ENVIRONMENTAL & QUALITY STANDARD		SHE2.23-F01
	GENERAL ELECTRICAL INSTALLATIONS		Revision Number
			00
			Page Number
			1 of 8

		<p>4. FI/g/v is under normal conditions not in direct contact with surrounding atmosphere</p> <p>5. Vessels, pumps, fitting, pipes constructed and maintained to prevent significant leakage under normal conditions</p> <p>Examples:- a distillation unit on open premises (can be in building)</p> <ul style="list-style-type: none"> - Equipment installed outside buildings that enclose a Zone 1 - Instrument control bay sealed with windows of strengthened glass - Open-air loading and unloading areas for road / rail tankers where: the use of flexible pipes is confined to connection to vehicle; a closed system is used; rapid drainage for escaping liquid is provided; valves are well maintained; blank flanges are fitted over pipe ends when not in use - Storage rooms for portable containers <p><i>Apparatus: Same as for Zone 1, also Ex N, Ex p</i></p> <p>Zone 21: Combustible dusts / fibres in suspension under normal conditions in sufficient quantities to produce and explosive mixture; or metallic dusts present.</p> <p>Examples:- rooms containing machines (grinders, cleaners, scrapers) that are not provided with suitable dust extraction / exhaust systems.</p> <ul style="list-style-type: none"> - Open bins & hoppers - Terminal points of open conveyors - Spouts in grain processing Offices, sugar Offices, coal Offices. <p><i>Apparatus: Ex d, Ex ia/ib, Ex m, Ex q, Ex p</i></p> <ul style="list-style-type: none"> • Zone 22: Dusts/ fibres not normally suspended in sufficient quantities, but deposits / accumulations can interfere with safe dissipation of heat from electrical apparatus, or can be ignited by arcs, sparks or burning material from electrical apparatus. <p>Consider distance between Offices & electrical machinery and normal cleaning procedures.</p> <p>Examples: - cotton / textile mills, grain silos, clothing manufacturing, woodworking Offices.</p> <p><i>Apparatus: Same as for Zone 21, also DIP A22 & B22</i></p> <ul style="list-style-type: none"> • Annexure B: Certain flammable liquids, gasses, vapours – ignition temperature on hot surfaces; upper and lower explosive limits; flash points; approximate density • List of various dusts and explicability
5.1.5.	SHE5.03-F01	SABS 051 – The prevention of explosive and electrical hazards in hospitals
5.1.6.	SHE5.03-F01	SABS 086 – The installation and maintenance of electrical equipment in explosive atmospheres
5.1.7.	SHE5.03-F01	SABS 089 – COP for the petroleum industry

5.2. Legal Reference.

5.2.1. See legal register.

5.3 Other Requirements.

	SARMA GUIDELINE		Document Number
	SAFETY, HEALTH, ROAD TRANSPORT, ENVIRONMENTAL & QUALITY STANDARD		SHE2.23-F01
	GENERAL ELECTRICAL INSTALLATIONS		Revision Number
			00
			Page Number
			1 of 8

5.3.1. Local Authorities.


6. RECORDS

Rec Nr	Reference Nr	Description	Storage Space	Retention Time
6.1.	EMPLOYERS [SHE5.11-F02-23]	Appointment Documents.		
6.2.	EMPLOYERS [SHE2.23-F02]	Facility electrician inspection documentation of electrical installations.		
6.3.	EMPLOYERS	Hazardous Locations classification list.		
6.4.	EMPLOYERS	Inspection certificates of equipment inspections in hazardous locations.		
6.5.	EMPLOYERS	Purchasing documents		
6.6.	EMPLOYERS [SHE2.12-F02]	Lock out register/ permit.		

7. PROCEDURE

7.1. IMPLEMENTATION/REGULAR INSPECTIONS

- 7.1.1. The facility appointed electrician [SHE5.11-F02-5] will check and test the emergency generator on a monthly basis, and will do an electrical power shut off test on the emergency generator to check the systems efficiency. Any defects identified will be repaired immediately, after first consulting with the CEO [SHE5.11-F02-1];
- 7.1.2. The Section 16(2) Appointee's [SHE5.11-F02-3] will be required to assist if and where required, and must ensure that both the facilities are in good and serviceable condition at all times and
- 7.1.3. Distribution boards will be checked and cleaned preferably on a quarterly basis or as scheduled, checks will include;
- 7.1.3.1. Labelling [SHE2.13-F01];
 - 7.1.3.2. Earthing and polarity [SHE2.21-F01], [SHE2.23-F01];
 - 7.1.3.3. Damaged or open cables [SHE2.23-F01];
 - 7.1.3.4. Temporary wiring [SHE2.23-F01];
 - 7.1.3.5. Opening on panels [SHE2.23-F01];
 - 7.1.3.6. Loose back plates [SHE2.11-F01] & [SHE2.23-F01];
 - 7.1.3.7. Colour Code [SHE1.25-F01];
 - 7.1.3.8. Lock out facilities [SHE2.12-F01];
 - 7.1.3.9. Main switch accessibility [SHE2.12-F01] and
 - 7.1.3.10. Demarcation [SHE1.21-F01].

	SARMA GUIDELINE		Document Number
	SAFETY, HEALTH, ROAD TRANSPORT, ENVIRONMENTAL & QUALITY STANDARD		SHE2.23-F01
	GENERAL ELECTRICAL INSTALLATIONS		Revision Number
			00
			Page Number
			1 of 8

7.1.4. Temporary wiring will be avoided, but where necessary to have, will comply with legal requirements and controlled by the facility electrician;

7.1.6. The Section 16(2) Appointee's [SHE5.11-F02-3] and Health and Safety representatives [SHE5.11-F02-8] will be responsible to do regular monthly inspections of installations and switches [SHE5.40-F02] to ensure compliance and

7.1.7. Persons permitted to perform installations will be appointed in writing [SHE5.11-F02-5] under Electrical Installation Regulation 9.

7.2. **DISTRIBUTION BOARDS (DB's)**

7.2.1. All distribution boards are to be designed so that the main switch is accessible at all times. The main switch must be clearly identified;

7.2.2. Lockout facilities [SHE2.12-F02] must cover all circuit breakers;

7.2.3. Circuit breakers must be labelled to a uniform standard. Labelling shall correspond to the legend on the distribution board (where applicable) and

7.2.4. DB boards must be marked to identify from where it is fed.

7.3. **STANDBY GENERATOR**

8. **ASSOCIATED DOCUMENTATION**

No.	Description	Document Number
8.1.	Register - Electrical Installation	[SHE2.23-F02]
8.2.	Certificate- Certificate of Compliance	[SHE2.23-F03]
8.3.	Certificate AIA	[SHE2.23-F04]
8.4.	Appointment Electrical Installation Inspector	[SHE5.11-F02-23]
8.5.	Appointment Inspector GMR2(1)	[SHE5.11-F02-5]
8.6.	Certificate General Machinery Regulation2(1)	[SHE2.23-F05]
8.7.	Certificate Electrical control board (ECB)	[SHE2.23-F06]
8.8.	Agreement Section 37(2)	[SHE5.43-F02]